MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Spring

CSE3038 Computer Organization

COURSE DESCRIPTION FORM

Offering Department	Department of Computer Engineering		Undergraduate must course (6th semester)
Course Code	CSE3038		
Course Name	Computer Organization		
Language of Instruction	English		
ECTS	7		
Contact Hours	Theoretical (T): 3	Practice (U): 2	Laboratory(L):
Pre-requisites	CSE2138 – Systems Programming, CSE3015 – Digital Logic Design		
Instructor	**Name**	Prof. Dr. Haluk Rahmi Topçuoğlu	
	E-mail	haluk@marmara.edu.tr	
Course Materials	**Mandatory**	Computer Organization and Design: The Hardware/Software Interface, (5th Edition) by David A. Patterson and John L. Hennessy, Morgan Kaufmann Publishers, 2014	
	Recommended	Computer Organization and Architecture, Design for Performance, William Stallings, 2003	
Course Objectives	The objective of this course is to introduce basics and design details of a modern computer architecture/organization. Its targeted that passing students analyze and design datapath components and control units efficiently in a simple computer architecture.		
Course Content	Performance analysis in different computer architectures. Instruction Set Architecture. MIPS instructions. Arithmetics. Datapath component design. Single cycle instruction and datapath and control design for pipeline based architecture. Memory Hierarchy		
Learning Outcomes	**LO1**	Ability to measure performance of a computer system by using computer architecture performance parameters and making a choice between different computer systems.	
	LO2	Ability to understand, design and improve programs in MIPS assembler language by using basics of MIPS instruction set architecture.	
	LO3	Ability to explain steps of arithmetic for natural and floating point numbers and how the corresponding hardware works	
	LO4	Ability to design basic single cycle datapath and corresponding control units and develop new instructions by considering a given instruction set	
	LO5	To understand pipeline datapath and corresponding control units, ability to analyze the dangers and to propose solutions against dangers	
	LO6	Ability to design and analyze simple cache systems by using basic memory hierarchy principles	

Program Outcomes		**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**LO6**
PO3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way so as to meet the desired result (a); ability to apply modern design methods for this purpose (b).		a		a,b		a
PO4	Ability to devise (a), select, and use (b) modern techniques and tools needed for engineering practice (1); ability to employ information technologies effectively (2).		1.b		1.b		
PO5	Ability to design (a) and conduct experiments, gather data (b), analyze and interpret results for investigating engineering problems (c).		b,c		a,b,c		
PO14	Knowledge of data structures and algorithm analysis (a), database management systems (b), operating systems (c), software engineering (d), computer architecture (e) and automata theory (f) in computer engineering.	e	e	e	e	e	e

	No	**Week**	**Subjects**	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**LO6**
Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning Outcomes, Assessment Methods	**S1**	1-2	Introduction to computer architecture; CPU performance mesaurement and evaluation; CPU Benchmarks	MF,Q					
	S2	3	Instruction Set Architecture; Introduction to MIPS instructions		MF,P				
	S3	4	MIPS instructions; Addressing Modes; Sample MIPS Programs		MF, P,Q				
	S4	5-6	Arithmetics; Multiplication and Division and Necessary Hardwares			MF			
	S5	6	Representation of Floating Point Numbers; Arithmetics of Floating Point Numbers			MF			
	S6	7-8	Arithmetic Logic Unit (ALU) Design; Datapath Design				MF, P		
	S7	9-10	Single cycle architecture datapath and control design				MF, P, Q		

	S8	11	Introduction to pipelining technique					MF,Q		
	S9	12	Datapath and control design for pipeline based architecture					MF		
	S10	13-14	Memory hierarchy; Cache Design; Virtual Memory; TLB Cache						MF,Q	

	No	**Type**	**Weight**	**Implementation Rule**	**Make-up Rule**
Assessment Methods and Weights	**MF**	Midterm, Final	60%	Its allowed to use handwritten single page A4 size cheatsheet. No calcuiaton and communication device allowed during exams.	Marmara University regulations will be followed for make-up exams.
	Q	Quiz	9%	There are 3 quizes during the semester.	-
	H	Homeworks	6%	Delivery date of the homeworks are one week after the announcement. In every homework only selected questions are evaluated. Homeworks that are not submitted graded as zero. There are total of 3 homeworks.	-
	P	Project	25%	Delivery date of the projects are two weeks after the announcement. No late submission. Projects that are not submitted graded as zero. There are total of 2 projects.	
	TOTAL		100%		

Determining Letter Grades

- The letter grades will be determined based on the midterm and final exams, quizzes and homeworks.
- In order to determine the letter grade, a curve or catalog based method will be followed based on the total average scores of the students.
- The final exam score and the total average score of the student must be at least 35 to pass the course.
- According to Marmara University Undergraduate regulations, the weight of the final exam must be at least 40 out of 100.

Assessment	Midterm	Quizzes	Homeworks	Project	Final	TOTAL
Weight	20	9	6	25	40	100

Teaching Method, Student Work Load

Time Applied by the Instructor			
No	**Method**	**Explanation**	**Hours**
1	Lectures	Lectures are given in class using the board or via presentations. Example questions are solved to enhance the concepts.	14x3=42
2	Problem Session/ Practice	Problems related to the course topics are solved on the board.	14x2=28
3	Laboratory	Experiments are done in the laboratory or theoretical concepts covered during the lectures are practiced using computer exercises.	
4	Interactive Courses	Questions are asked to students during lectures and they are encouraged to guess the answers (peer learning is also in this category)	
5	Field Work	Students attend activities outside the campus.	
6	Midtrm	Midterm exam is given during the midterm week.	2
7	Final	Final exam is given during the final exam week.	2
Estimated Time to be Allocated by a Student			
8	Project	The students carry out research about the problem given in the project, design and implement their solution and prepare a report.	20x2=40
9	Homeworks	The students solve the problems given as homework.	
10	Pre-class learning of Course Material	The students study and learn the new subjects from course materials.	14
11	Review of Course Material	Students review the course subjects from course materials to prepare for the exams and homeworks.	45
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.	2
Total			175

Academic Honesty

Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

In case academic dishonesty is observed, the first authority is the instructor of the course. The instructor may decide to give the student zero for the homework(s)/lab(s)/exam(s), give the letter grade FF, or may take disciplinary action.